



**Advanced Manufacturing
is “MADE IN CANADA”**
An SME perspective

PURPOSE

This purpose of this report is to uniquely highlight the risks, challenges and opportunities that face Canada’s small- and medium-sized advanced manufacturers as compiled by two national industry organizations: the Canadian Association of Mold Makers and Automate Canada.

Based on research done by these organizations, as well as the Trillium Advanced Manufacturing Network, the combined contribution of moldmaking and industrial automation firms to the Canadian economy is sizeable. Together, these sectors employ 58,000 skilled personnel in Canada and contribute \$7.2billion to Canadian gross domestic product (GDP).

While this report was prepared during the COVID-19 pandemic, it is not about COVID-19. Instead it is a broader examination of the state of advanced manufacturing in Canada with a focus on small- and medium-sized manufacturing facilities which are the heart of many towns and mid-sized communities across Canada. The impact of COVID-19 has only further amplified the need for action now.

In the long term, our goal is to combat the hollowing out of the advanced manufacturing sector, a risk faced by small- and medium-sized manufacturing facilities. This report also provides a list of recommendations and observations from this segment of Canada’s advanced manufacturing sector that, to date, has been mainly excluded from these other processes. The recommendations identify some objectives for industry and suggests how others can support a strong, sustainable domestic manufacturing sector in Canada.



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BACKGROUND

At the height of the COVID-19 pandemic, when access to Personal Protective Equipment (PPE) and other essential medical equipment was limited due to the breakdown of the global supply chain, manufacturing facilities (both small and large) pivoted, often as part of a collaborative effort, to support efforts to navigate the COVID-19 pandemic.

In surveys conducted by the Trillium Network for Advanced Manufacturing, WindsorEssex Economic Development Corporation (WE EDC) and industry associations such as the Canadian Association of Mold Makers (CAMM), Automate Canada, the Auto Parts Manufacturers Association (APMA) and the Canadian Tooling & Machining Association (CTMA), results suggested that many manufacturers shifted production away from traditional products such as automotive parts, molds, automation equipment, and distilled beverages, to medical devices and supplies, personal protective equipment (e.g. face shields, masks, gowns), sanitizer and specialized equipment for the production of these items.

This finding was further supported by a series of surveys conducted by Automate Canada and CAMM which surveyed a total of 571 companies between March and September of 2020. About one-third of respondents each week said they were able to “answer the call” for the re-tooling and the production of medical equipment manufacturing. Interestingly, three-quarters of the companies that pivoted to manufacturing medical equipment/items plan to continue servicing that sector, according to the survey.

During the last few years, there have been a number of well-written reports that provide a list of recommendations to support Canada’s advanced manufacturing sector, such as: “Advanced Manufacturing” (Canada’s Economic Strategy Tables, 2018), “Factory Forward: How Advanced Manufacturing is Retooling Ontario’s Industrial Heartland” (Innovation Economy Council, 2020), “Driving Prosperity: The Future of Ontario’s Automotive Sector” (Province of Ontario, 2019), and “Drive to Win: Automotive Advisor Report” (Ray Tanguay – Innovation, Science and Economic Development, 2018). And, while these reports highlight important themes, like skills and talent development, technology adoption, collaboration and branding that are priority areas regardless of size, these reports tend to predominantly reflect the views of larger companies and/or larger cities.

In 2017, McKinsey Global Institute (MGI) published a report on the state of manufacturing in the USA, entitled, “Making it in America: Revitalizing US Manufacturing”. The report cited that the biggest US manufacturing firms were generating



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strong returns, but many of the small and mid-size suppliers that account for most of the establishments and employment in the US-industrial base were struggling—and as a result, they were unable to invest in new equipment and technologies that would boost productivity. MGI concluded that this was a concerning trend that impacts large firms because they face more risk without a healthy ecosystem of domestic suppliers to provide more agility and opportunities for collaboration. This prescient conclusion is being played out in Canada.

The ability to pivot quickly and effectively from producing things like automobiles, hockey gear and apparel and alcohol into producing PPE and other medical essentials was critically important to the well-being of communities across the country and the country as a whole.

A common cry from many was that Canada needs to become more secure by becoming more self-sufficient. One way to do so is to support a vibrant manufacturing sector in Canada. There is no question that Canada has benefited because of its open trade policies however COVID-19 has shown that Canada must also protect itself against pandemics and other unknown future shocks to ensure that its immense resources, industrial know-how and talent must be preserved and available for the economic and health security and resiliency of communities across Canada. This delicate balance specifically refers to Canada’s trading relationship with China (a non-market economy) in exchange for greater domestic manufacturing capacity.



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OVERVIEW OF OUR PROCESS

Automate Canada and CAMM came together to discuss developing a strategy to help our companies grow and to support our home communities. We are “makers”! As such, we wanted to develop a strategy informed by our SME members that would help us **make** a difference as well as outline solutions for others to consider on how best to support us. With this philosophy as our guiding principle, we put in place a five-step process to prepare this report:

Step #1: Partnership with Trillium Network for Advanced Manufacturing. Trillium Network for Advanced Manufacturing, established in 2015, is a non-profit organization dedicated to raising public and investor awareness of Ontario's advanced manufacturing ecosystem. Automate Canada and CAMM partnered with Trillium to define and quantify Canada's advanced manufacturing technology sector.

Step #2: Review of Existing Reports. Copies of manufacturing reports published for Canada and/or Ontario were shared with members of the two organizations to assess whether existing reports and recommendations resonated with our members. While some of the themes and recommendations reflected priorities by small- and medium-sized advanced manufacturing facilities, it was concluded that the reports failed to completely reflect our circumstances. (See Annex A for a summary of the collective assessment.)

Step #3: Concurrent Small-Group Discussions. Automate Canada, led by Shelley Fellows, held four focused discussions with a small number of CEOs (and other C-suite representatives) from Automate Canada. At the same time, Jonathon Azzopardi convened a small group of CEOs from CAMM and the moldmaking sector while Mike Bilton held a focused discussion with representatives from Tier 1 and 2 automotive suppliers. These discussions were structured along a set of common questions across all three groups. Each small group also conducted a SWOT analysis (i.e., the strategic planning technique used to help organizations identify strengths, weaknesses, opportunities, and threats related to business competition or project planning). The SWOT analysis from each of the three groups was then further compiled into one analysis.

Step #4: Combined Focus Group. The participants from the three groups came together twice to review the aggregated SWOT analysis. As a group they discussed the summary to ensure that it accurately reflected their views. Once there was consensus, the group's discussion the observations and focused on action-oriented



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recommendations. External facilitators from the WindsorEssex Economic Development Corporation (WE EDC) were used because of the familiarity with many of the members and knowledge of the sector. WE EDC was also asked to facilitate because of the link between the well-being of this sector and the impact on community economic development.

Step #5: Draft Report. A draft summary report was prepared and circulated to all participating members. Feedback was sought and comments were incorporated until a consensus document was achieved.



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OUR RECOMMENDATIONS

The recommendations are grouped into three key themes but many of the issues are intertwined and mutually-reinforcing. Where there was a clear convergence with an existing recommendation, we tried to use the same language. Otherwise, these recommendations reflect the needs and interests of Canada’s small- and medium-sized advanced manufacturing companies, the three key themes are:

- Skills and Talent Development:
- Technology Adoption & A Culture of Innovation
- Branding & Collaboration

Please see the following tables for more details.

Recommendations from Canada’s Small- and Medium-Sized Advanced Manufacturing Sector

Theme #1: Skills and Talent Development

Objective: Develop a talent pipeline that is skilled, ready and interested in helping Canadian advanced manufacturing facilities to grow and prosper

Key Performance Indicators:

- Increase number of apprentices
- Increase number of companies that participate in MFG Day
- Increase the number of disadvantaged groups working in the advanced manufacturing sector
- Shorten the time required to bring on board temporary foreign worker
- Reduce the number of unfilled jobs in the sector

Proposed Actions:

Industry

Government and Others

i) Expose Canadians (students, Parents, Teachers and Guidance Counsellors) to advanced manufacturing through public visits to facilities

- Advanced Manufacturing Facilities should seek to open their doors throughout the year
- Participate in MFG Day. Manufacturing Day is held annually on the first Friday in October with the goal of showing the reality of modern manufacturing careers

- All (Government, Economic Development/Labour Market Support Services/Educational Institutions): Support and help raise awareness of these types of activities
- Government: identify and eliminate red tape that prohibits greater industrial access without

			forgoing the health and safety of the businesses and the visitors
ii)	Seek ways to fully integrate First Robotics within school curriculums	<ul style="list-style-type: none"> • Increase the number of companies that support First Robotics Teams. Some may want to consider adopting a school • Ensure that participants of First Robotics have access to expert advice/mentors and newest technologies and systems 	<ul style="list-style-type: none"> • Government: The Province of Ontario recently announced the inclusion of coding into its curriculum. This is good news! Why not, also consider ways to align coding with First Robotics? School Boards (with Provincial support) could seek ways to allow Teachers to support participants in First Robotics during the class rather than an after-school activity
iii)	Re-assess how labour costs are measured. Labour costs will continue to be paramount for low-margin and tradable products, but companies in many industries are reassessing the downsides of offshoring and lengthy supply chains.	<ul style="list-style-type: none"> • Increase the number of companies that make footprint decisions using a “total factor performance” approach that considers logistics, lead time, productivity, and risk—as well as proximity to suppliers, other company operations, and final demand. In the words of one CEO, look at ways of collaborating with low-cost countries rather than competing with them 	<ul style="list-style-type: none"> • Government: Canada should ensure that the Temporary Foreign Worker Program meets the needs of Canadian companies to access short-term skills and labour shortages (high-wage and low-wage positions). • Government: create a national foreign manufacturing student scholarship pilot program for foreign workers in Canada after accreditation.
iv)	Increase diversity and inclusion	<ul style="list-style-type: none"> • All companies should develop a diversity & inclusion plan as a way to increase their productivity • Companies should consider participating in Girls Day, an annual event that gives young girls 	<ul style="list-style-type: none"> • Educational Institutions: Develop and deploy proactive measures to encourage young women to pursue education and a career in advanced manufacturing



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		exposure to manufacturing processes and possible manufacturing careers.	<ul style="list-style-type: none"> • Build A Dream: Continue to seek ways to raise awareness of the importance of female inclusion
v)	Increase access to NGen’s AMPUP (Accelerating Manufacturing Performance Upskilling Program)	<ul style="list-style-type: none"> • Increase companies that access this service • CAMM, Automate Canada, St. Clair College and WE EDC should consider re-submitting digital twinning/virtual simulation program to NGen as a possible expansion to AMPUP 	<ul style="list-style-type: none"> • NGen should seek to collaborate with smaller manufacturing clusters. ISED should consider easing up terms and conditions so that NGen can capitalize on opportunities for collaboration.

Recommendations from Canada’s Small- and Medium-Sized Advanced Manufacturing Sector

Theme #2: Technology Adoption & a Culture of Innovation

Objective: Support small- and medium-sized advanced manufacturing companies to more easily make the transition to Industry 4.0 practices, with a highest priority on digital transformation

Key Performance Indicators:

- Close the productivity gap of the advanced manufacturing sectors between Canada and the USA
- Increase incentives to deploy Canadian-made technologies, including “buy Canadian” clauses in government procurement bids
- Increase the level of innovativeness at the micro and macros levels, as measured by the number of patents, new product ideas, new product launches
- Increase the number of companies that have adopted continuous improvement and/or lean management strategies
- Increase the number of robots/cobots utilized in the sector so as to close the gap with other countries like Germany and Japan

#	Proposed Actions:	Industry	Government & Others
i)	Accelerate the pace of Canada’s advanced manufacturing sector’s ability to adopt	<ul style="list-style-type: none"> • Increase the number of robots/cobots being utilized in 	<ul style="list-style-type: none"> • Government: Manufacturing needs supportive government



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	Industry 4.0 practices, particularly digitization thus eliminating the drag on its productivity performance.	Canada and increase the % of companies that deploy at least one Industry 4.0 practice	programs and policies with long-term certainty and funding.
ii)	Ensure that existing programs and services available to support advanced manufacturing companies are well-utilized and well-known	<ul style="list-style-type: none"> Access programs and services that are currently available to companies to conduct continuous improvement audits or CME’s technology assessment program 	<ul style="list-style-type: none"> Government: Canada should endorse the recommendation by its Advanced Manufacturing Table to lower the perceived risk of adopting new technology by creating CANADVANCE. Consideration should be given to a tech adoption centre that is located in Canada’s highest concentrated region of advanced manufacturing (Windsor-Essex). (Opportunity: Germany’s PEM Motion e-vehicle ramp-up factory)
iii)	Need to find ways to spur greater innovation	<ul style="list-style-type: none"> Companies should consider intra- or inter-company innovation catalyst programs, innovation mentorship programs and/or hiring a Chief Innovation Officer/ Champion 	<ul style="list-style-type: none"> Superclusters/Canada: Given the importance of digitization, NGen and the Digital Technology Supercluster should partner to support small- and medium-sized advanced manufacturing facilities across Canada
iv)	Support “Buy Canadian” technology at all government levels, much like other countries that have a domestic procurement strategy and are signatories to the World Trade Organization	<ul style="list-style-type: none"> Firms should seek governments as first customers to unlock client confidence and build strong revenue streams. Large firms in Canada need to change incentive structures among their own purchasing teams. Large firms can benefit 	<ul style="list-style-type: none"> Government: Government procurement at all levels is needed to support the growth of Canadian SMEs and improve Canada’s 55th-place ranking for government procurement of advanced technology products. We need to be a top-10 country.



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		<p>from identifying local suppliers that provide critical, high-value components with stability. Large firms should consider how to better engage smaller companies to respond to customers’ demand for customization and choice</p>	<ul style="list-style-type: none"> • Increase incentives for Canadian large firms who collaborate with Canadian SME to develop “Made in Canada” solutions. This will help grow domestic production capacity organically
v)	<p>Spur greater local investment in existing and/or new advanced manufacturing companies</p>	<ul style="list-style-type: none"> • Companies should consider continue to support community initiatives, including venture funds to support local companies 	<ul style="list-style-type: none"> • Government: Canada’s/Ontario’s tax system should look at ways to provide tax credit, e.g., much like Newfoundland’s or BC’s venture capital tax credits

Recommendations from Canada’s Small- and Medium-Sized Advanced Manufacturing Sector

Theme #3: Branding and Collaboration

Objective: Re-brand Canada’s advanced manufacturing sector as good-value for high-quality, innovative products that are made in a hometown near you.

Key Performance Indicators:

- Increase name recognition of Canada’s advanced manufacturing sector, domestically and abroad
- Increase number of formal and informal collaborative initiatives
- Increase funding to support US marketing efforts
- Increase marketing efforts targeted to young people
- Increase representation by CAMM and/or Automate Canada at national policy tables

#	Proposed Actions:	Industry	Government & Others
i)	Canada’s advanced manufacturing sector (small to large firms) needs a strong brand that offers a clear value proposition to customers (domestic and international) as well as its employees, suppliers, and customers.	<ul style="list-style-type: none"> • CAMM and Automate Canada, along with its members, should consider developing a coordinated and cohesive marketing strategy 	<ul style="list-style-type: none"> • Government (Canada): Opportunity to assess how to improve Canada’s Economic Table vision for advanced manufacturing of: “We are Canadian innovators, driven by imagination and inclusion, committed to creating a better world through the things we make



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			#MadeBETTERinCANADA”. Is a social impact statement what sells Canadian products?
ii)	Appeal to the new generation of workers	<ul style="list-style-type: none"> Companies need to use messaging and social media forums that are tailored to a younger, technologically- savvy generation 	<ul style="list-style-type: none"> All: Seek to promote the sector to Canada’s youth and foreign workers to excite them about Canada’s advanced manufacturing sector
iii)	Seek opportunities for a collaborative approach to the adoption of advanced manufacturing technologies across supply chains, by adopting a systematic way of connecting companies (formally and informally)	<ul style="list-style-type: none"> CAMM and Automate Canada, along with their members should continue to build on current efforts of collaboration by creating strategic alliances. 	<ul style="list-style-type: none"> All: Identify ways to support formal and informal strategic alliances
iv)	Create a “digital thread” across advanced manufacturing supply chains to lead to new sources of productivity and revenue	<ul style="list-style-type: none"> Small- and medium-sized advanced manufacturing should continue to see opportunities to diversify their export markets but they need to continue to nurture and strengthen market opportunities with US customers and suppliers 	<ul style="list-style-type: none"> Government: Much focus has been given to emerging markets, but this trade strategy needs to be re-balanced to help small- and medium-sized facilities access the US Market. Now, more than ever with CUSMA and COVID-19, supply chains are becoming more localized. For example, Global Opportunities for Associations (GOA) provides contribution funding to support national associations undertaking new or expanded international business development activities, in strategic markets and sectors, for



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			the benefit of an entire industry (member and non-member firms) but excludes the US Market
v)	A seat at the table: small and medium-sized facilities, particularly those located outside of Ottawa, GTA_K-W corridor need to be given an opportunity to be heard because their needs and interests are not always reflected by those currently at the “table”	<ul style="list-style-type: none"> • CAMM and Automate Canada, on behalf of its members should develop a strategy to identify key policy tables and nominate members for participation with support to speak to key issues 	<ul style="list-style-type: none"> • All: Existing initiatives (Economic Table on Advanced Manufacturing, Innovation Economy Council, NGen) that are focused on advanced manufacturing should assess whether their existing process fully represent the interests of small- and medium-sized companies



CONCLUSION

Manufacturing is being reshaped by three major trends: rising demand, the convergence of multiple new technologies and shifting global value chains.

With respect to supply chain changes, the implementation of the Canada-US-Mexico Agreement (CUSMA), along with the impact of COVID-19 have caused a need to re-assess underlying strategic assumptions for the advanced manufacturing technology sector and add a new layer of uncertainty. Previous reports on the state of the advanced manufacturing may no longer be as relevant.

This report provides an opportunity for industry, industry associations, governments and others to work together to capitalize on opportunities and to develop mitigation strategies for further disruptions. All levels of Government and industry associations such as CAMM and Automate Canada have identified the three pillars as critical ways to engage and support Canadian SMEs in the advanced manufacturing sector. All these organizations should take the opportunity to measure their own mandates to see how they support the three pillars which were concluded in this report.

- Skills and Talent Development:
- Technology Adoption & A Culture of Innovation
- Branding & Collaboration

This document is not intended to be the solution to how we can grow the Advanced Manufacturing sector, instead it is our attempt to design a dashboard for our government programs and to guide our policy makers to measure and justify long-term certainty for funding and support. It is also intended to help focus our conversations with regional coalitions with large and small manufacturers, workers, technology experts, educators, public officials, and investors working together to make “Made in Canada” real and relevant to all our stakeholders.



ANNEX A Report Review

Strategic Plan	Priority Areas	Alignment with CAMM/ Automate Canada		
		High	Medium	Low
“Innovation and Competitiveness Imperative” (Canada’s Economic Strategy Tables), 2019	High-Growth firm – Own the Podium			X
	Regulatory Relief		X	
	Skills and Talents	X		
	Technology Adoption	X		
	Infrastructure (Digital and Physical)			X
	Collaboration		X	
	Brand Canada	X		
“Advanced Manufacturing” (Canada’s Economic Strategy Tables), 2018	Market Diversification		X	
	Skills and Talents	X		



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	Technology Adoption	X		
	Hyper-growth			X
“Factory Forward: How Advanced Manufacturing is Retooling Ontario’s Industrial Heartland” (Innovation Economy Council), 2020	Raise the Profile/Brand Canada	X		
	Talent Development	X		
	Technology Adoption	X		
	Collaboration		X	
“Driving Prosperity: The Future of Ontario’s Automotive Sector” (Province of Ontario), 2019	A Competitive Business Climate	X		
	Innovation	X		
	Talent Development	X		
“Drive to Win: Automotive Advisor Report” (Ray Tanguay – Innovation, Science and Economic Development), 2018	Innovation, creativity, and continuous improvement	X		
	Quality of life			X
	Skills and Talents	X		
	Technology Adoption	X		
	Favourable Business Environment		X	



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	Brand Canada	X		
Automate Canada/CAMM: Focus Group Summary Notes	US Market (CUSMA)	X		
	Low-Cost Countries	X		
	COVID-19	X		